Nutrient Criteria Plan

Water Protection Program

Background

Excessive nutrient loading poses significant problems for the waters of the state in many areas of Missouri. It accounts for approximately 10 percent of the water bodies in the 2002 303(d) list. Nutrient related water quality issues include:

- Proliferation of nuisance algae and the resulting unsightly and harmful bottom deposits
- Turbidity due to suspended algae and the resulting unsightly green color
- Dissolved oxygen depletion resulting from the decomposition of overabundant algae and other plants that can have a negative impact on aquatic life
- Organic enrichment when algal blooms die off, which perpetuates the cycle of excessive plant growth

The parameters that may be used to gauge the extent of nutrient impairment can be divided into two general categories – causal and response variables. Causal variables include the primary nutrients, generally listed as total nitrogen and total phosphorus. Response variables include chlorophyll-a, turbidity, and secchi depth. The relationship between causal and response variables is often difficult to define, due to the influence of other environmental factors such as temperature, amount and intensity of sunlight, depth of water body, water movement, and the nitrogen to phosphorus ratio, to name a few.

Two nutrient compounds are regulated by existing standards: Ammonia (NH_3) is regulated due to its toxicity potential to aquatic life and Nitrates (NO_3) are addressed in public drinking water supply. Nitrate levels above 10 mg/L can have a negative impact on the health of infants. However, total nitrogen (TN) and total phosphorus (TP) standards have not been determined and promulgated to protect the designated uses of whole body contact recreation, protection of aquatic life, and drinking water sources. In an effort to provide a mechanism for addressing these concerns, the State of Missouri is planning to develop and promulgate nutrient criteria.[1] The Environmental Protection Agency (EPA) is encouraging all states to develop criteria to help resolve this long-standing water quality problem.

Proposed Approaches for Nutrient Criteria Development

Lakes

The University of Missouri conducted an analysis of existing data on Missouri's lakes under a contract funded by the Missouri Department of Natural Resources. The analysis included a review of the technical literature related to this issue. The data set included a minimum of four years of information from each site and included chemical, physical and watershed land use information. Data from 147 Missouri lakes and reservoirs were evaluated. Results of this analysis include:

[1] There has been an effluent limit of a monthly average of 0.5 mg/L TP established for point source facilities within the James River Basin (hydrologic units 11010001 and 11010002). This is in accordance with a Total Maximum Daily Load that was established for that area.

- The curve of the relationship between total phosphorus concentration to lake primary production, which is the production of green plant material from light and available nutrients, has an inflection point around 20 ug/L TP (0.02 mg/L TP).
- Reductions in TP in lakes will bring about minimal reductions in primary production as long as TP concentration remains above the 20 ug/L level.
- Watershed nonpoint source Best Management Practices (BMPs) could be expected to result in approximately 15 percent reduction in TP, but this would result in small improvements in lake appearance. In some watersheds, improved waste management at large concentrated animal feeding operations (CAFOs) or point source discharges, could result in greater reductions in TP loads and more improvement in lake appearance
- Taste and odor do not appear to have a direct relationship with lake trophic state.
- Land conversion is not a practical solution for reducing nutrient loads. The amount of row cropping that exists in a watershed has an identifiable relationship with declines in ambient water quality. It would not be reasonable to address nutrient concerns by attempting to change land use.
- There is a significant difference in total phosphorus and total nitrogen concentration between lakes in the different ecoregions of Missouri. In particular, the most nutrient rich lakes are in the vicinities of the big rivers, whereas the lowest nutrient concentrations for lakes are in the Ozarks.
- Using EPA's suggested lake nutrient criteria would place about 75 percent of Missouri's lakes in non-compliance.

In light of these findings, it is proposed that, for purposes of data evaluation, lakes will be grouped first by ecoregion, then for designated uses for the lakes within each ecoregion. In Missouri, there are 405 classified lakes, all of which are designated for protection of aquatic life and human health associated with fish consumption, as well as watering of livestock and wildlife. Currently, 147 of these lakes are also listed for whole body contact, although that number is expected to change to include all the classified lakes following rule changes scheduled for 2006. The state also lists 4 lakes for cold water fisheries, 254 lakes for boating and canoeing, 108 lakes for drinking water supply, and 6 lakes for industrial purposes.

The ultimate goal of nutrient criteria development is protection of these designated uses. However, the correlation of nutrient loading with use impairment is not always clear. In the case of protection of aquatic life, a certain amount of nutrient loading is desirable. Without it, there is insufficient phytoplankton and macrophyte growth to support a robust food chain. On the other hand, excessive nutrient loading has been associated with toxins produced by cyanobacteria, as well as some fish kills that resulted from loss of oxygen due to plant decay. The range of desirable nutrient concentrations for striking the right balance between these two undesirable situations will vary, depending on lake morphology and the types of aquatic species that are present, among other factors.

There is a stronger correlation between nutrient causal and response variables when determining suitability for whole body contact recreation. Knowles and Jones (2003) reported that lakes in Missouri with a mean TP concentration of 20 µg/L or less had Secchi depths of 1.2 m or greater about 92 percent of the time. Downing et al. (2001), analyzing a broad spectrum of lake data, noted a significant correlation between TP concentration and chlorophyll-a levels. When TP concentration exceeds 30 µg/L, there is an elevated probability of Cyanobacteria dominance of phytoplankton, which is associated with chlorophyll concentrations of greater than 10 µg/L. This, in turn, often results Secchi depth readings of less than 1 meter (Canfield and Bachmann, 1981). Water clarity is a primary consideration in determining the suitability of a lake for whole body contact. Because the cause and response relationship is clearer here, evaluation of the nutrient data will begin with examination of what limitations on TP are appropriate for maintaining protection of whole body contact recreation in lakes throughout the state.

In lakes used for drinking water supply, potential problems from nutrient loading include toxins excreted by several species of algae, filter clogging, also because of algae, and disagreeable tastes and odors in the drinking water. Drinking water problems are often attributed to the presence of specific species of algae that have different growth rates and produce a range of toxicity potential in response to nutrient concentration. While lowering nutrient concentrations in drinking water lakes can be reasonably expected to improve drinking water quality, specific numerical limits will require site specific studies.

For the remaining designating uses in lakes, there is either insufficient data, or the effects of nutrient loading do not appear significantly detrimental. Therefore consideration of designated uses for lakes in the development of nutrient criteria will start with whole body contact, followed by protection of aquatic life, and then drinking water supply, which is likely to be addressed on a case by case basis.

Criteria for response variables, such as Secchi depth or turbidity also will be defined. For lakes with more specific uses beside protection of aquatic life and whole body contact recreation, criteria for other response variables may be deemed appropriate. For instance, in lakes used for drinking water supply, a limit for total organic carbon may be implemented, as that parameter appears to have a more direct correlation with the concentration of toxic disinfection byproducts (Knowlton and Jones, 2003).

For each of these designated uses, if response variables do not show distinguishable correlation to the input variables, further evaluation will be done based on morphological characteristics of lakes, including area, depth, volume, and flushing rates. In the end, nutrient criteria may be specific both to ecoregion and lake morphology. Obrecht et al. (2005) have proposed a method of nutrient evaluation based on residence time in the lake, watershed size, and the amount of it that is devoted to crop production. It is expected that this will be most useful in the Central Irregular Plains and Western Cornbelt ecoregions. All lakes are expected to have standards for total nitrogen and total phosphorus.

Streams

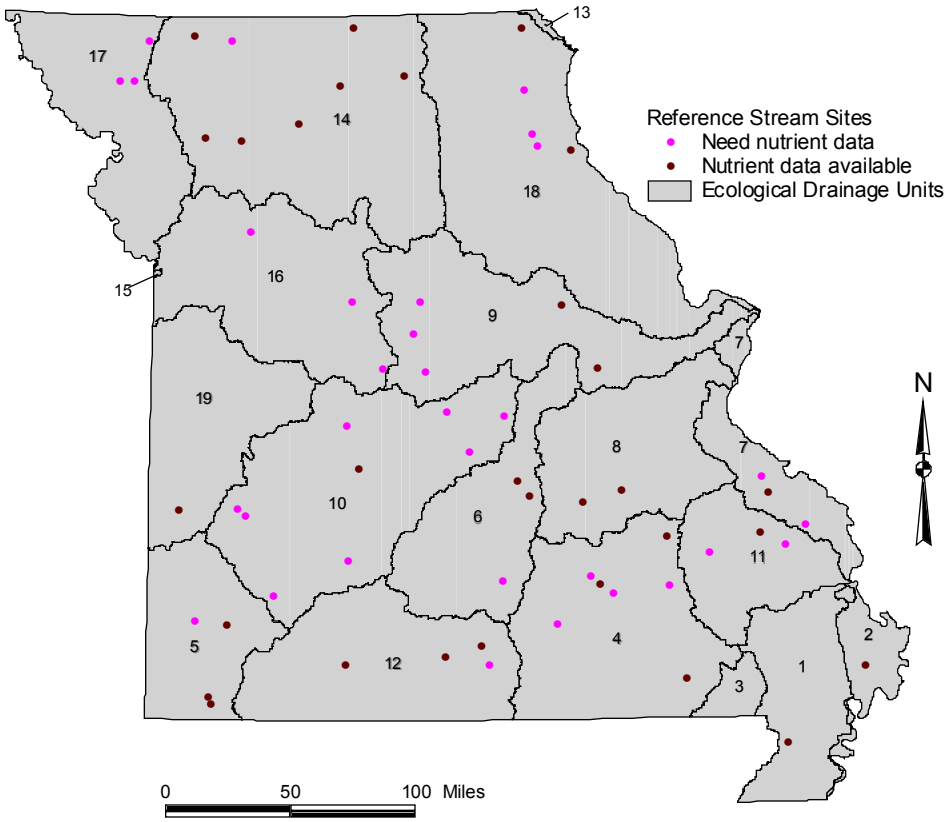
Reference Streams

Missouri plans to base nutrient criteria for flowing waters on data collected from biocriteria reference streams within each Ecological Drainage Unit (EDU). There are 62 reference stream sites in the state. Reference sites are those that have been determined to have minimal impact from human activity, and are representative of relatively pristine conditions. Selection and identification of reference sites is based on evaluation of human disturbance, stream size, stream channel, location of wildlife refuges, and determination of migration barriers, historical connections among streams, and known zoogeographical patterns (Sarver et al. 2002).

The selection of reference streams has also included extensive monitoring for macro-invertebrates. Macro-invertebrates include aquatic insects, snails, clams, and worms that reside in stream bottoms. They are a significant link in the food chain, and the types and quantities of species present are reliable indicators of a stream's ecological health. The Department's Environmental Services Program undertook this effort to ensure every classified stream could be compared to the best biological diversity that currently exists within each EDU.

Department field biologists and the Missouri Resource Assessment Program (MoRAP) established the EDUs of Missouri. The delineation of EDUs was based on extensive data collection and rigorous scientific analysis. Basing the criteria on nutrient data from reference streams will ensure a level of water quality that will support diverse and healthy aquatic populations. Figure 1 shows the EDUs and reference stream sites. A summary is in Appendix B.

Coordination with Regional Technical Assistance Group (RTAG)
Several Missouri Department of Natural Resources staff have participated in Regional Technical Assistance Group (RTAG) meetings with EPA Region 7 and members from sister states. All nutrient data available to the state has been shared with the RTAG group. It will be used to derive recommended values for nutrient criteria based on broad Level III ecoregions as illustrated in Figure 2 (EPA 2004). Communications and coordination with EPA Region 7 staff and other participants in the RTAG group have been on going and will continue in the future. RTAG members will have the opportunity to comment on Missouri's approach and methodology for developing nutrient criteria.



Symbol	Ecological Drainage Unit
1	Mississippi Alluvial Plain/Little Drainage
2	Mississippi Alluvial Plain/Lower Mississippi/St. John's Bayou
3	Mississippi Alluvial Plain/White/Black Drainages
4	Ozark/Current/Black Drainages
5	Ozark/Elk/Spring Drainages
6	Ozark/Gasconade Drainage
7	Ozark/Mississippi Tributaries between Missouri and Ohio Rivers
8	Ozark/Meramec Drainage
9	Ozark/Moreau/Loutre Drainages
10	Ozark/Osage Drainage
11	Ozark/Upper St Francis/Castor Drainages
12	Ozark/White Drainage
13	Plains/Des Moines Drainage
14	Plains/Grand/Chariton Drainages
15	Plains/Kansas Drainage
16	Plains/Missouri Tributaries between Blue and Lamine Rivers
17	Plains/Missouri Tributaries between Nishnabotna and Platte Rivers
18	Plains/Mississippi Tributaries between Des Moines and Missouri Rivers
19	Plains/Osage Drainage

Figure 1: Ecological Drainage Units and Reference Stream Sites

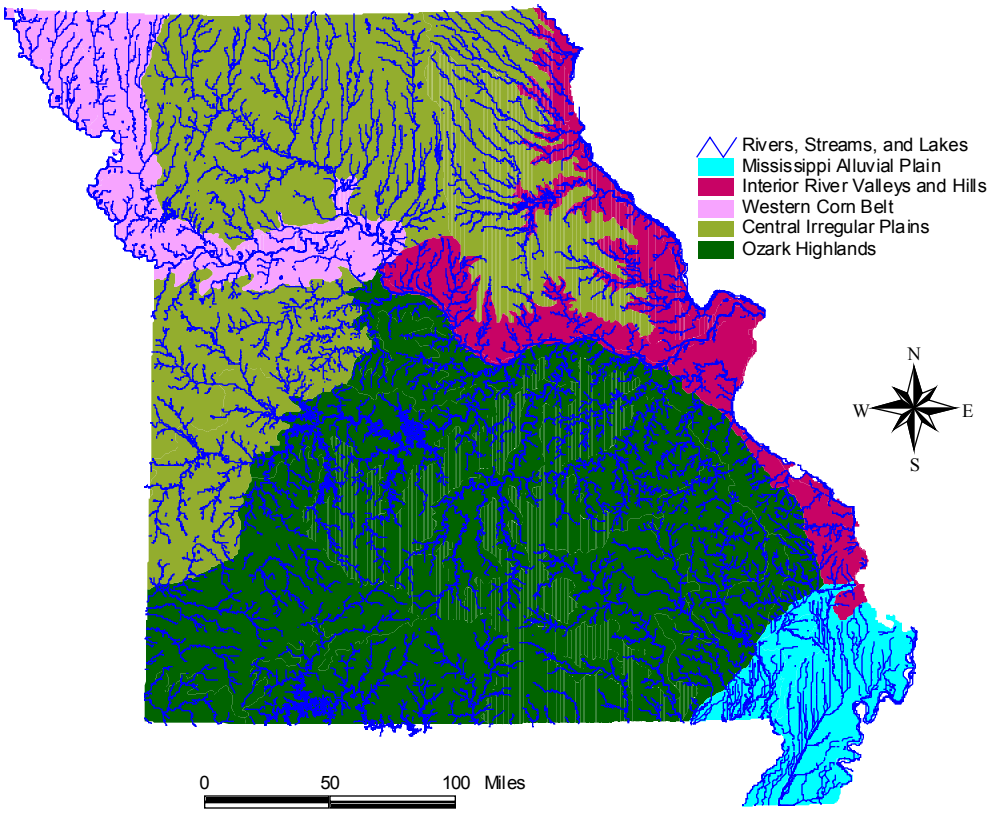


Figure 2: Level III Ecoregions in Missouri

Big Rivers

A plan for the development of nutrient criteria in the state's big rivers, including the Mississippi, Missouri, and possibly the Current, Gasconade and Osage Rivers, will be developed following input and recommendations from the Mississippi River Basin Nutrient Science Workshop, scheduled for October, 2005 in St Louis. This workshop is being organized in response to a petition to EPA from the Sierra Club.

Wetlands

Wetlands are a valuable natural resource for controlling the movement of nutrients through the hydrologic cycle and can prevent excessive loading to streams and lakes. They act as a filter by retaining nutrients that have been transported from upland areas. However, wetland area in Missouri has been diminished by 90 percent from an estimated pre-European settlement of 4.8 million acres (MoRAP). Criteria for nutrients in wetland must take into consideration the high variability of wetland characteristics throughout the state. This variability can be at least partially accounted for through wetland classification, of which there are several methods (EPA, 2002). At this point, there has

not been a complete and comprehensive inventory and classification of wetlands in Missouri.

The most broadly accepted classification system is the one developed by Cowardin et al. (1979). Federal agencies and some state agencies have adopted this as the official system for wetland inventory and classification. This is a multi-tiered approach for wetland and deepwater classification that incorporates landscape position, hydrologic regime and type of substrate. The first tier includes five systems: marine, estuarine, riverine, lacustrine, and palustrine. Obviously, the first two can be dropped from consideration in Missouri. Hydrologic regimes identify the second tier, or subsystems. For example, riverine systems include tidal, lower perennial, upper perennial, and intermittent subsystems. The next tier, class, identifies dominant vegetative or substrate material. For instance, the upper perennial subsystem includes rock bottom, unconsolidated bottom, aquatic bed, rocky shore, and unconsolidated shore. The classification system is then further divided into subclasses, dominance types, and modifiers which give greater specificity to biological, hydrological, and physiographic characteristics of wetland areas.

Application of this type of classification will be essential to identifying reference wetland areas to sample for nutrient concentrations and response factors. At this point, it is not known how many locations will need to be studied. Leahy (2001) has identified nine types of wetland in the state. They are marshes, sinkhole ponds, shrub swamps, swamps (only in the southeastern floodplain, or "bootheel"), bottomland forests, oxbow lakes and sloughs, riparian areas, bottomland prairies, and groundwater seeps. These types can be classified by the Cowardin system at the system and subsystem level. More detailed classification will require field study and assessment. Wetland criteria development for nutrients will depend on the results of this.

Nutrient Criteria Development Timelines and Priorities

Availability of data will be a critical issue in the timing of nutrient criteria development. The University of Missouri, Columbia, has collected a large data set for Missouri lakes. Dr. Jack Jones has begun analyzing the data for nutrient criteria development under a contract with the Missouri Department of Natural Resources. This collaborative effort will continue with the goal to develop and promulgate lake nutrient criteria by 2006. Further nutrient data collection on biocriteria reference streams must occur before statistically sound analysis can proceed. The plan is to promulgate stream nutrient criteria by 2008. Scheduling details are in appendix A.

Public Participation

Input into nutrient standards development will be initiated through the Water Quality Coordinating Committee or a sub-committee thereof. This is a group that is made up of representatives from sister agencies, industry, municipalities, environmental groups, commodities groups and so forth. It would provide technical expertise and understanding of the impact of rulemaking on major stakeholder groups. All rules must undergo a public comment period during which any citizen can make official comments that the department will consider for inclusion in the rule. The Missouri Legislature's Joint Committee on Administrative Rulemaking (JCAR) receives the final draft of the rule prior to the public comment period. After the public comment period is over, and the

final Order of Rulemaking is approved by the Missouri Clean Water Commission, JCAR has an opportunity to officially comment on the rule prior to the department filing the rule with the Secretary of State and the Office of Administration for publication. A flow chart describing the rule making process is at the end of this report.

Data collection:

Streams
Quality Assurance Project Plans are being altered to accommodate the data collection needed on reference streams throughout the state. The data collection and analysis that will be done by the department's Environmental Services Program, Water Quality Monitoring Unit.

- Data parameters will include total nitrogen, total phosphorus, chlorophyll-a content, benthic chlorophyll, and turbidity, to be measured in the field and in the lab.
- At each of the reference stream sites, eight samples will be taken. Sampling will be done at different times of the year so that seasonal variations in nutrient content and environmental response can be accounted for.

Lakes
Adequate lake data exist to evaluate various approaches. Annual data collection activities done by the University of Missouri will continue and all new data will be added to the existing database. It may be included for future analyses if any significant changes are observed.

Wetlands
The extent of data collection that will be required is not known at this time. It will depend on the results of wetland assessment and classification. Reference sites for each type of wetland that is identified as being substantially represented in the state will then be sampled for total nitrogen, total phosphorus, and chlorophyll-a content.

Data Analysis and Criteria Development

Lakes

- For whole body contact - development of regression lines for secchi depth as a function of total phosphorus concentrations, grouped by lake eco-region. A target secchi depth of 1 meter is proposed.
- For aquatic life support - The 25th percentile of all data collected from each category of lake and stream. This is similar to the Region 7 RTAG's approach to the development of nutrient recommendations.

Streams

- The 75th percentile of data collected from reference streams.
- Calculating the geomean of all data collected from a reference stream or lake.

- Develop load duration curves to look at loading across a broad spectrum of flow regimes.
- Explore and develop regression lines for response variables, such as chlorophyll-a, benthic chlorophyll, and turbidity based on the causal variables of total nitrogen and total phosphorus.
- Within ecoregions, explore potential correlation between stream order and nutrient data (causal and response).

Wetlands

Data from each type of wetland (yet to be determined) will be evaluated. Criteria development will be based on forthcoming recommendations from EPA.

Nutrient Criteria Parameters

All waterbodies will have a Total Phosphorus and Total Nitrogen standard when the rule promulgation procedure is completed. Lakes will also have a clarity standard that will be measured with secchi disk. Options include TSS, turbidity, NFR or some type of clarity measure similar to a secchi disk reading. Chlorophyll *a* (chl *a*) is another parameter being considered for standards development. A concern with this parameter is being able to link the information to nutrient levels in lakes. Currently, chl *a* levels do not correlate well with nutrient loading. Nuisance levels of benthic algae are the concern in streams and are not captured by chl *a* measurements.

Disclaimer

This nutrient criteria plan is based on the best science readily available. Because of the dynamic nature of cause and response variables of nutrient loading to water bodies and evolving information based on continuing research, this plan is subject to change at any time.

Appendix A: Milestones for development of nutrient criteria

Year (calendar)	2005		2006				2007				2008			
Quarter	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Lakes														
Formation and meeting of stakeholder groups	x													
Data analysis		x	x											
Propose criteria/ public comment			x											
Promulgate Rules				x	x	x								
Streams														
Formation and meeting of stakeholder groups				x										
Completion of QAPPs for data collection	x													
Data collection			x	x	x	x	x	x						
Data analysis								x	x	x				
Propose criteria/ public comment										x				
Promulgate Rules											x	x	x	x

Appendix B: Median Cause and Response Variables from Reference Streams within Missouri EDUs

Water body	County	Total Nitrogen		Total Phosphorus		Chlorophyll-a		Turbidity	
		mg/L	n	mg/L	n	µg/L	n	NTU	n
Mississippi Alluvial Plain/Little Drainage									
Main Ditch	Dunklin	0.21	13	0.183	13	2.638051	8	6.6	14
Mississippi Alluvial Plain/Lower Mississippi/St. John's Bayou									
Maple Slough Ditch	Mississippi	0.215	10	0.236	10	2.575979	8	4	11
Ozark/Current/Black Drainages									
Big Creek	Shannon	0.12	10	0.05	10			0.2495	2
Blair Creek	Shannon	0.54	2	0.022	2		0	0.4995	2
East Fork Black River	Reynolds	0.17	32	0.025	33		0	0.499	2
Jack's Fork	Texas & Shannon	0.77	2	0.01	14		0	0.499	2
Little Black River	Ripley	0.16	13	0.017	13	0.962113	8	4.5	10
Sinking Creek	Reynolds	0.81	2	0.037	2		0	0.499	2
Sinking Creek	Shannon	0.81	2	0.035	2		0	0.499	1
Ozark/Elk/Spring Drainages									
Big Sugar Creek	McDonald	2.1	10	0.021	128	0.45	8	1.5	10
Center Creek	Lawrence	4.7	10	0.01	9		0	3.375	2
Jones Creek	Jasper & Newton	2.91	3	0.005	3		0	1.5	1
Mike's Creek	McDonald	0.93	16	0.01	16	0.227133	8	1	11
Ozark/Gasconade Drainage									
Little Piney Creek	Phelps	0.6	28	0.02	28	0.932766	8	1.25	9
Mill Creek	Phelps	0.27	14	0.011	14	0.672431	8	1.5	10
West Piney Creek	Texas	0.26	6	0.007	6		0	0.8445	2
Ozark/Mississippi Tributaries between Missouri and Ohio Rivers									
Apple Creek	Cape Girardeau	0.68	2	0.04	2		0	1.58	3
River Aux Vases	Ste Genevieve	0.28	5	0.02	5		0	1.5	3
Saline Creek	Ste Genevieve	0.44	13	0.023	13	2.855303	8	3	10
Ozark/Meramec Drainage									
Huzzah Creek	Crawford	0.17	17	0.007	17	0.386215	8	0.75	12
Meramec River	Dent	0.19	8	0.007	8		0	1.84	8
Ozark/Moreau/Loutre Drainages									
Boeuf Creek	Franklin	0.32	11	0.045	11	2.0381	8	5	11
Burris Fork	Moniteau	0.76	3	0.17	3		0	8.26	1
Loutre River	Montgomery	0.39	9	0.03	9		0	6.74	16

Water body	County	Total Nitrogen		Total Phosphorus		Chlorophyll-a		Turbidity	
		mg/L	n	mg/L	n	µg/L	n	NTU	n
Moniteau Creek	Moniteau	0.41	5	0.08	5		0	6.96	2
Petite Saline Creek	Cooper	1.67	2	0.12	2		0	14.55	2
Ozark/Osage Drainage									
Cedar Creek	Cedar	0.82	3	0.02	3		0	4.5	3
Deer Creek	Benton	0.43	4	0.015	4		0		0
Horse Creek	Cedar	0.62	4	0.03	3		0	7.51	2
Little Maries River	Maries	0.55	3	0.05	3		0	1.05	3
Little Niangua River	Hickory & Camden	0.49	41	0.025	42	1.551795	8	14.5	10
Pomme de Terre River	Dallas, Greene, & Polk	0.55	2	0.02	2		0	2.06	2
Saline Creek	Miller	0.15	5	0.02	5		0	0.499	1
Tavern Creek	Miller		0		0		0		0
Turnback Creek	Lawrence	2.36	3	0.02	3		0	3.515	2
Ozark/Upper St Francis/Castor Drainages									
Castor River	Madison	0.08	13	0.009	13	0.697783	8	1	11
Little Whitewater River	Bollinger	0.68	2	0.025	2		0	1.1995	2
Marble Creek	Iron & Madison	0.31	5	0.05	4		0	0.499	3
Ozark/White Drainage									
Bryant Creek	Douglas	0.58	66	.025	58			1.06	3
Bull Creek	Christian & Taney	0.5	15	0.02	15		0	0.499	11
North Fork of the White River	Douglas	0.35	8	0.0105	8	0.7	8	7.5	8
Spring Creek	Douglas	0.8	2	0.005	1		0	0.499	2
Plains/Grand/Chariton Drainages									
East Fork Grand River	Worth	0.68	32	0.08	32		0	10.1	2
Grindstone Creek	DeKalb	1.04	14	0.183	14	9.255303	8	39	11
Locust Creek	Putnam	0.78	71	0.08	71	8.42646	8	93	16
Marrowbone Creek	Daviess	0.64	31	0.07	31	9.745272	8	33	10
No Creek	Livingston & Grundy	1.2	77	0.16	71		0	98	3
Spring Creek	Adair	0.74	21	0.0747	21	3.941559	8	30.05	18
West Fork of Big Creek	Harrison	0.52	1	0.07	1		0	7	1
West Locust Creek	Sullivan	0.99	30	0.864	33	4.655385	7	47	11
Plains/Missouri Tributaries between Blue and Lamine Rivers									
East Fork of Crooked Creek	Ray	0.53	6	0.085	6		0	12.8	2
Heath's Creek	Petttis & Saline	1.23	7	0.3	7		0	40.9	3

Water body	County	Total Nitrogen		Total Phosphorus		Chlorophyll-a		Turbidity	
		mg/L	n	mg/L	n	µg/L	n	NTU	n
Middle Richland Creek	Morgan	1.56	1	0.13	1		0	20.8	1
Plains/Missouri Tributaries between Nishnabotna and Platte Rivers									
White Cloud Creek	Nodaway	4.33	5	0.195	5		0	29.9	3
Honey Creek	Nodaway	5.3	5	0.15	5		0	58.15	2
Long Branch	Nodaway	1.25	2	0.2	2		0	48.2	2
Plains/Mississippi Tributaries between Des Moines and Missouri Rivers									
Little Fox River	Clark	0.85	11	0.14	12	6.57961	8	68	9
Middle Fabius River	Lewis	0.76	5	0.065	6		0	8.72	3
North River	Marion		0		0		0		0
South Fabius River	Marion	1.77	2	0.045	2			5.595	2
South River	Marion	2.35	8	0.069	8	6.1312	8	41	8
Plains/Osage Drainage									
Little Drywood Creek	Vernon & Barton	0.91	30	0.086	30	4.345	8	19.15	19

Data sources
Missouri Department of Natural Resources
Regional Technical Assistance Group
U.S. Geological Survey

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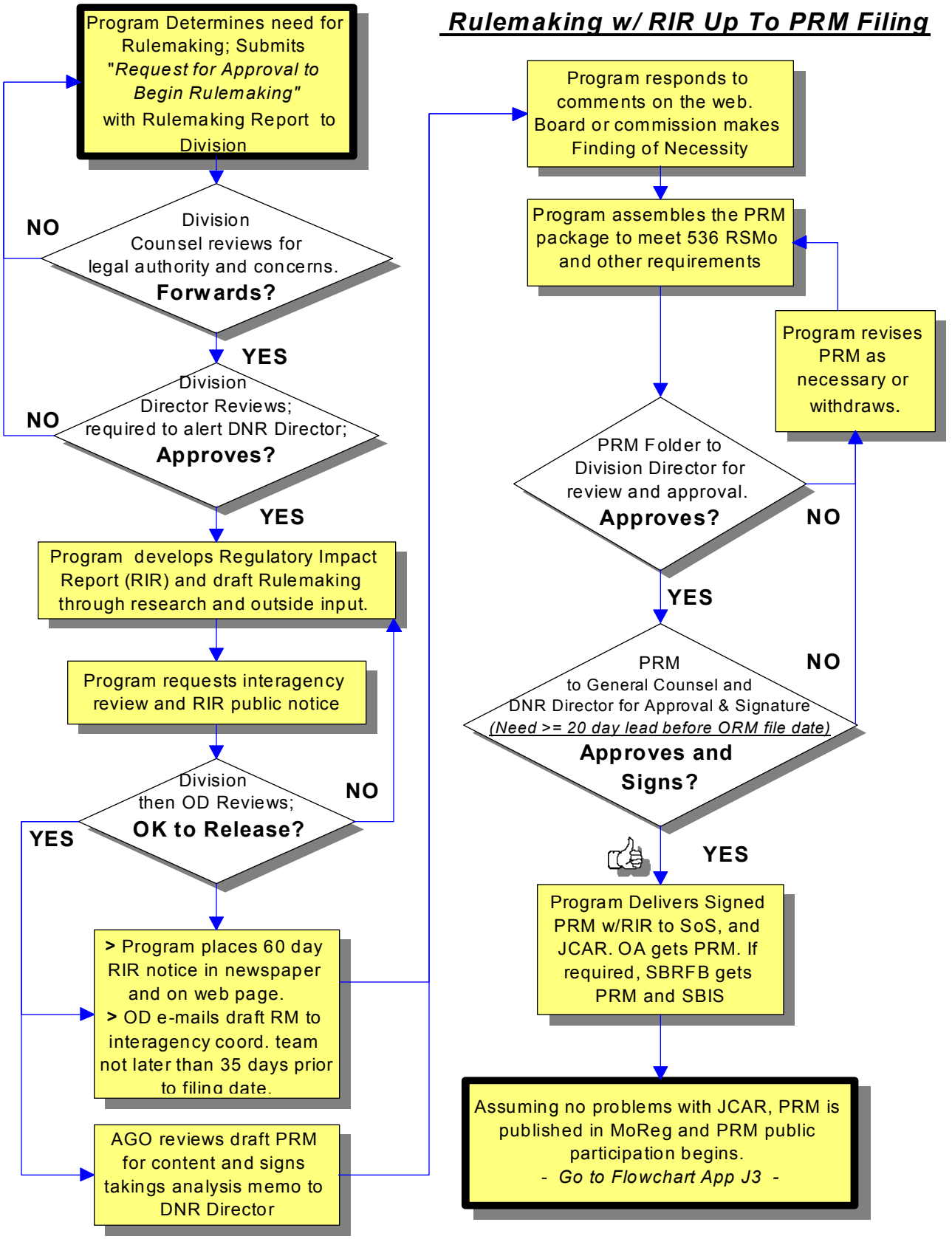
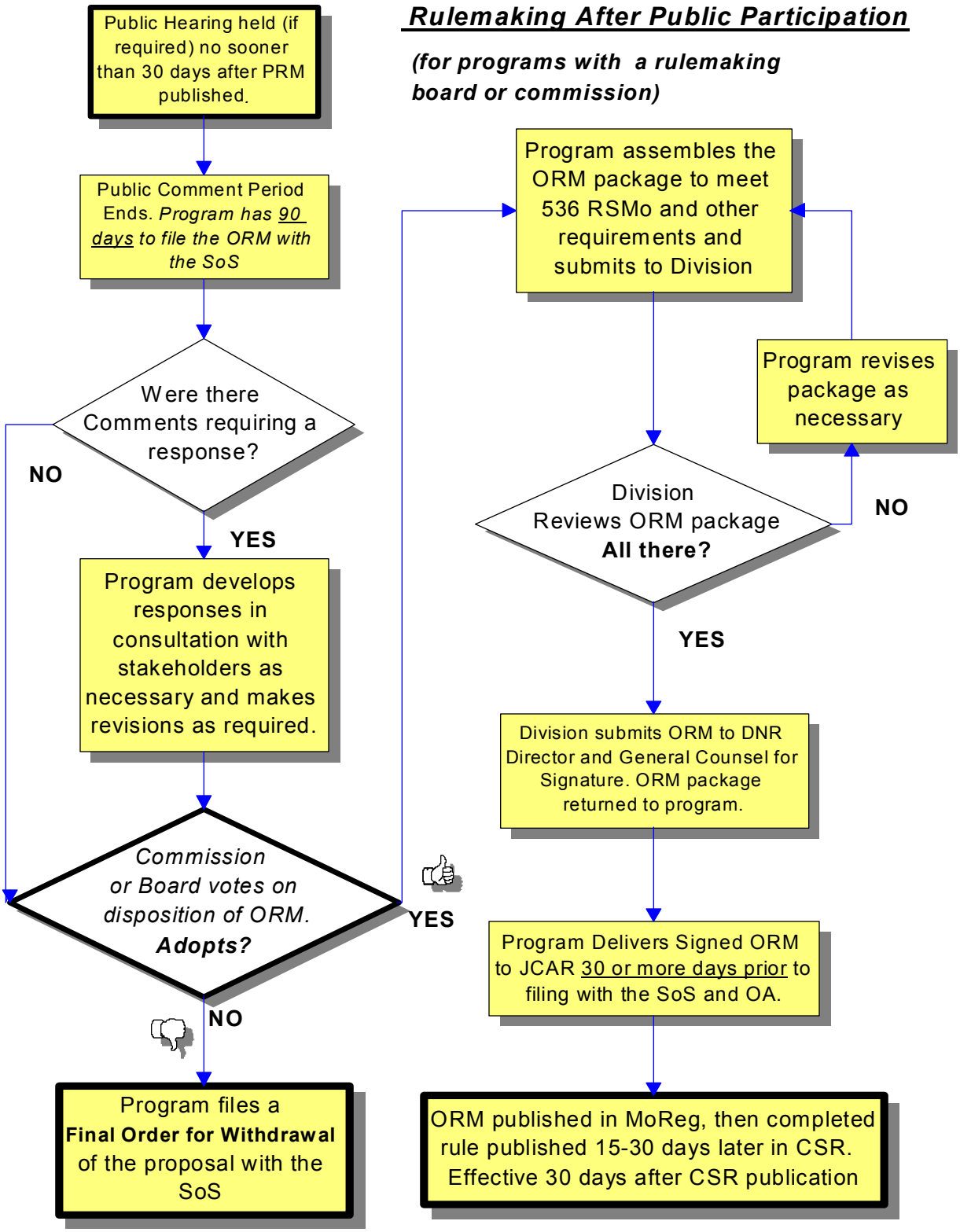

Rulemaking w/ RIR Up To PRM Filing
Program Determines need for Rulemaking; Submits "Request for Approval to Begin Rulemaking" with Rulemaking Report to Division
Division Counsel reviews for legal authority and concerns. Forwards?
NO
YES
Division Director Reviews; required to alert DNR Director; Approves?
NO
YES
Program develops Regulatory Impact Report (RIR) and draft Rulemaking through research and outside input.
Program requests interagency review and RIR public notice
Division then OD Reviews; OK to Release?
NO
YES
> Program places 60 day RIR notice in newspaper and on web page.
> OD e-mails draft RM to interagency coord. team not later than 35 days prior to filing date.
AGO reviews draft PRM for content and signs takings analysis memo to DNR Director
Program responds to comments on the web. Board or commission makes Finding of Necessity
Program assembles the PRM package to meet 536 RSMo and other requirements
Program revises PRM as necessary or withdraws.
PRM Folder to Division Director for review and approval. Approves?
NO
YES
PRM to General Counsel and DNR Director for Approval & Signature (Need >= 20 day lead before ORM file date) Approves and Signs?
NO
YES
Program Delivers Signed PRM w/RIR to SoS, and JCAR. OA gets PRM. If required, SBRFB gets PRM and SBIS
Assuming no problems with JCAR, PRM is published in MoReg and PRM public participation begins.
- Go to Flowchart App J3 -


Rulemaking After Public Participation
(for programs with a rulemaking board or commission)
Public Hearing held (if required) no sooner than 30 days after PRM published.
Public Comment Period Ends. Program has 90 days to file the ORM with the SoS
Were there Comments requiring a response?
NO
YES
Program develops responses in consultation with stakeholders as necessary and makes revisions as required.
Commission or Board votes on disposition of ORM. Adopts?
YES
NO
Program files a Final Order for Withdrawal of the proposal with the SoS
Program assembles the ORM package to meet 536 RSMo and other requirements and submits to Division
Program revises package as necessary
Division Reviews ORM package All there?
NO
YES
Division submits ORM to DNR Director and General Counsel for Signature. ORM package returned to program.
Program Delivers Signed ORM to JCAR 30 or more days prior to filing with the SoS and OA.
ORM published in MoReg, then completed rule published 15-30 days later in CSR. Effective 30 days after CSR publication